

REMARKS

The Examiner objected to the drawings.

The Examiner objected to claims 21, 23, 32, 33 and 35-37 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants gratefully acknowledge the Examiner's indication of allowable subject matter.

The Examiner rejected claims 15-18, 20, 22, 24-31 and 38-40 under 35 U.S.C. §103(a) as allegedly being unpatentable over Applicant's prior art in view of Joshi et al. (6,323,554) and Zhou et al. (6,376,353).

The Examiner rejected claim 19 under 35 U.S.C. §103(a) as allegedly being unpatentable over Applicant's prior art in view of Joshi et al. (6,323,554) and Zhou et al. (6,376,353) as applied to claim 15 above, and further in view of Adler et al. (6,259,128).

Applicants respectfully traverse the drawings objections and §103 rejections with the following arguments.

Drawings Objections

The Examiner objected to the drawings, alleging that “Figures 1-3E should be designated by a legend such as –Prior Art– because only that which is old is illustrated.”

In response, Applicants have submitted replacement sheets for FIGS. 2-3E, said replacement sheets comprising “RELATED ART” which is a commonly used phrase in numerous issued patents to represent a legend such as –Prior Art–. However, FIG. 1 already comprises “RELATED ART” and is therefore not amended herein.

35 U.S.C. §103

The Examiner rejected claims 15-18, 20, 22, 24-31 and 38-40 under 35 U.S.C. §103(a) as allegedly being unpatentable over Applicant's prior art in view of Joshi et al. (6,323,554) and Zhou et al. (6,376,353). In addition, the Examiner rejected claim 19 under 35 U.S.C. §103(a) as allegedly being unpatentable over Applicant's prior art in view of Joshi et al. (6,323,554) and Zhou et al. (6,376,353), and further in view of Adler et al. (6,259,128).

Applicants respectfully contend that claim 15 is not unpatentable over Applicant's prior art in view of Joshi and Zhou.

As a first example of why 15 is not unpatentable over Applicant's prior art in view of Joshi and Zhou, Applicant's prior art in view of Joshi and Zhou does not teach or suggest the features: "forming a second insulative layer on the first insulative layer ... and forming a damascene conductive wiring line structure within the second insulative layer".

The Examiner argues that "Applicant's prior art discloses a method ... that includes ... forming a first insulative layer (14) ...; forming a second insulative layer (8) on the first insulative layer (14); and forming a damascene conductive wiring line structure (3) within the second insulative layer (8)."

In response, Applicants respectfully contend that Applicant's prior art teaches **not to form** second insulative layer (8) on the first insulative layer (14); and **not to form** a damascene conductive wiring line structure (3) within the second insulative layer (8) in the manner described in Applicant's admitted prior art, because the copper plating solution from the copper wiring lines 3, 4, 5, and 6 are likely to result in deforming, damaging, and/or blowing up some or all of

the conductive wires/studs 61, 62, 63, and 64 during subsequent high temperature thermal processing. See specification, page 5, line 11 - page 7, line 17. In fact, the aforementioned problems with copper wiring lines 3, 4, 5, and 6 in second insulative layer (8) provides motivation for Applicants' invention which, of course, purposefully avoids use of copper wiring lines 3, 4, 5, and 6 in second insulative layer (8) in the manner described in Applicant's admitted prior art. Therefore, it is not obvious to form a second insulative layer (8) on the first insulative layer (14) and a damascene conductive wiring line structure (3) within the second insulative layer (8).

As a second example of why 15 is not unpatentable over Applicant's prior art in view of Joshi and Zhou, Applicant's prior art in view of Joshi and Zhou does not teach or suggest the feature: "removing a top portion of the first insulative layer such that an upper portion of the first damascene conductive wire/stud is above the first insulative layer after said removing".

The Examiner argues that "Joshi et al. disclose ... removing a top portion of the first insulative layer (15) such that an upper portion of the first damascene conductive wire/stud (16/17) is above the first insulative layer (15) after the removing (Fig. 4D; col. 8, lines 28-54)".

In response, Applicants respectfully contend that there is no disclosure in Joshi that any portion of the first insulative layer (15) is removed in the transition from FIG. 4C to FIG. 4D in Joshi. Indeed, the first insulative layer (15) has the exact same height in FIGS. 4C and 4D of Joshi.

In addition the Examiner's argument for why it is allegedly obvious to modify Applicant's admitted prior art by the alleged teaching of Joshi is not persuasive. The Examiner

argues that “it would have been obvious to one ordinary skill in the art at the time the invention was made to modify Applicant's prior art by removing a top portion of the first insulative layer such that an upper portion of the first damascene conductive wire/stud is above the first insulative layer after the moving as taught by Joshi et al. **to prevent corrosion** (col. 3, lines 31-63) (emphasis added)” In response, Applicants contend that the basis for preventing corrosion in Joshi is not due to the feature of “removing a top portion of the first insulative layer such that an upper portion of the first damascene conductive wire/stud is above the first insulative layer after said removing”, but is rather due to the use of a refractory metal having corrosion-resistant properties. See Joshi, Abstract; col. 4, lines 33-39; col. 6, lines 54-57; etc.

As a third example of why 15 is not unpatentable over Applicant's prior art in view of Joshi and Zhou, Applicant's prior art in view of Joshi and Zhou does not teach or suggest the feature: “forming a metallic capping layer on the first insulative layer such that the metallic capping layer is in conductive contact with the first damascene conductive wire/stud”.

The Examiner argues that “Zhou et al. disclose a method for forming an electronic structure where a substrate layer (1) that includes a first electronic device; forming a passivating layer (12) on the substrate layer (1) and in mechanical contact with the substrate layer (1); forming a first insulative layer (14/16) on the passivating layer (12) and in mechanical contact with the passivating layer (12); forming a first damascene conductive wire/stud (24) in the first insulative layer (14/16); forming a metallic capping layer (25) on the first insulative layer (14/16) such that the metallic capping layer (25) is in conductive contact with the first damascene conductive wire/stud (24) (Fig. 3c; col. 8, lines 10-27)”. In response, Applicants respectfully

contend that the Examiner's argument for why it is allegedly obvious to modify Applicant's admitted prior art by the alleged teaching of Zhou is not persuasive. The Examiner argues that "it would have been obvious to one ordinary skill in the art at the time the invention was made to modify Applicant's prior art by forming a metallic capping layer on the first insulative layer such that the metallic capping layer is in conductive contact with the first damascene conductive wire/stud; subtractively etching a portion of the metallic capping layer to form a subtractive etch metallic cap on the upper portion of the first damascene conductive wire/stud such that the subtractive etch metallic cap is in conductive contact with the first damascene conductive wire/stud as taught by Zhou et al. **to prevent peeling** (col. 3, lines 9-15)" (emphasis added).

In further response, Applicants contend that the basis for preventing peeling in Joshi is not due to the feature of "forming a metallic capping layer on the first insulative layer such that the metallic capping layer is in conductive contact with the first damascene conductive wire/stud", but is rather due to the use of an Al-Cu bond pad on pure copper with barrier layer therebetween. See Zhou, Abstract; col. 3, lines 9-15; col. 12, lines 35-39.

Based on the preceding arguments, Applicants respectfully maintain that claim 15 is not unpatentable Joshi and Zhou over and that claim 15 is in condition for allowance. Since claims 16-18, 19, 20, 22, 24-31 and 38-40 depend from claim 15, Applicants contend that claims 16-18, 19, 20, 22, 24-31 and 38-40 are likewise in condition for allowance.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims

and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account No. 09-0456.

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In the Drawings:

Please enter the replacements sheets for FIGS. 2-3E, attached herewith.